

## Construction Services International, Inc.

918 Chesapeake Avenue, Annapolis, Maryland 21403

27 October 2003

United States Environmental Protection Agency  
Region 2  
New Jersey Superfund Branch II  
Emergency and Remedial Response Division  
290 Broadway, 19<sup>th</sup> Floor  
New York, New York 10007-1866

Attention: Mr. Joe Gowers  
Project Manager

Subject: Groundwater Monitoring Plan  
NL Industries Superfund Site  
Pedricktown, New Jersey

Dear Mr. Gowers:

On behalf of the Interim Pedricktown Site Group (Group), Construction Services International, Inc. (CSI) has prepared this Groundwater Monitoring Plan to describe the procedures that will be used to obtain and analyze samples of groundwater from selected groundwater monitoring wells located at the NL Industries Superfund Site in Pedricktown, New Jersey. The purpose of the proposed monitoring event is to provide an update of groundwater conditions at the site, to evaluate potential changes that may have occurred to groundwater quality as a result of recently completed remedial activities for soil and sediment, and to provide additional information to assist in establishing a list of monitoring locations for future monitoring.

CSI will implement the monitoring event using sampling and analytical techniques that are generally consistent with those described in the *Sampling, Analysis and Monitoring Plan* (SAMP) and *Quality Assurance Project Plan* (QAPP), which were included in the *Remedial Design Work Plan* [GeoSyntec, 1997] previously approved by the United States Environmental Protection Agency (EPA). CSI's goal is to obtain samples of groundwater that are representative of aquifer conditions using low-impact techniques that are generally consistent with the procedures described in *Low-Flow (Minimal Draw down) Ground-Water Sampling Procedures* [Puls and Barcelona, 1998]. CSI will document the results of the monitoring event in a written report.

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gwsamplingplan[rev1]

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Mr. Joe Gowers  
NL Industries Superfund Site  
Page 2

## Background

Groundwater data have been periodically obtained from the site since 1983. The most recent evaluations of groundwater at the site were performed by the Group from 1997 through 1999 and were presented in the *Phase I Groundwater Evaluation Technical Memorandum* [GeoSyntec, 1998] and the *Phase II Groundwater Evaluation Technical Memorandum* [GeoSyntec, 1999]. In both documents, GeoSyntec concluded that (i) groundwater quality at the site had previously been impacted by operations at the site and (ii) groundwater quality had improved significantly following the termination of operations at the site. Also, in the *Phase II Groundwater Evaluation Technical Memorandum* [GeoSyntec, 1999], GeoSyntec recommended that consideration be given to evaluating possible remediation alternatives, including monitored natural attenuation and injection of alkalinity to enhance the removal of constituents from groundwater in combination with monitoring. Furthermore, residential wells were previously sampled and were determined to have been unaffected by site-related constituents.

Pursuant to a Consent Decree issued by EPA, the Group conducted remedial activities for soil and sediment, which were completed in May 2003. The remedial action included the excavation, stabilization and off-site disposal of soil, sediment and debris that contained lead at concentrations above the remedial action objective. As described in the *Phase II Groundwater Evaluation Technical Memorandum*, it is possible that the removal of soil, sediment, and debris from the site may result in improved groundwater quality at the site. During the performance of the remedial activities at the site, several groundwater monitoring wells were accidentally damaged. Two monitoring wells, MW-29 and MW-30, were damaged and abandoned. Several monitoring wells (i.e. HS, IS, JD, RS, and T-C) were damaged and need to be abandoned. Two monitoring wells, KS and KD, were destroyed.

Monitoring wells KS and KD were located in the area where lead and cadmium were most highly concentrated in groundwater. To provide a means to continue to monitor groundwater quality in that area, CSI will install two new wells at the approximate former locations of KS and KD. One of the new wells will be installed to a depth of approximately 20 feet (i.e. KS) and the other to a depth of approximately 30 feet (i.e. KD). For consistency of well identification, the replacement wells will be identified as KSR and KDR. CSI will also replace monitoring wells JD and 30 with new wells. Damaged monitoring well JD will be abandoned. Monitoring wells JD and 30 will be replaced with new wells JDR and 30R to depths of approximately 30 feet. The new wells will include 10 feet of 0.010-inch slot well screen.

CSI will also abandon permanently, without replacement, damaged monitoring wells HS, IS, RS, and T-C, in accordance with New Jersey Department of Environmental Protection regulations. Due to the extensive monitoring well network at the site, the damaged wells can be abandoned without detriment to the coverage of the well network. Wells HS and RS are located hydraulically up gradient from the central portion of the site in which groundwater quality was most affected. Well CR2 will provide any up gradient groundwater data necessary in future

# Construction Services International, Inc.

Mr. Joe Gowers  
NL Industries Superfund Site  
Page 3

monitoring events. Well IS is located along the eastern perimeter of the site. Wells MW-22, MW-23, JS and JDR can be used to provide adequate data from the eastern portion of the site without well IS. Well T-C is located near the center of the site, but it was installed and used as an observation well in a previous aquifer pumping test and is unnecessary for groundwater monitoring. Wells HS, IS, RS and T-C are no longer needed to evaluate groundwater quality at the site, as there are other, better suited wells.

Certain other wells may have been damaged during remedial activities, but the damage is not apparent based upon visual observations. For example, the protective steel casing of MW-27 was dislodged during remedial activities. However, the well is likely intact. CSI will further evaluate monitoring well MW-27 during sampling. As described in additional detail below, CSI will use turbidity and other field parameters during this monitoring event to evaluate whether or not representative samples of groundwater can be obtained from the monitoring wells. If MW-27 is intact, then CSI will reinstall the protective casing; if not, then CSI will recommend that MW-27 be abandoned.

## *Groundwater Monitoring*

CSI will initiate groundwater monitoring activities at the site upon receipt of EPA's approval of the procedures and schedule provided herein. During the groundwater monitoring event, CSI will (i) measure the depth to groundwater in each well to be sampled; (ii) monitor field parameters; (iii) obtain groundwater samples; (iv) submit the samples for laboratory analysis for volatile organic compounds (VOCs), total lead and cadmium, and dissolved lead and cadmium; (v) validate the laboratory data; and (vi) prepare a report to summarize the data. For comparison of data, CSI will collect groundwater samples from the monitoring wells last sampled in 1999, where possible, plus replacement wells KSR, KDR, JDR and 30R. Monitoring wells preliminarily selected for sampling are identified in Table 1. A site plan is provided as Figure 1. CSI will evaluate the groundwater quality at the selected wells using field parameters to determine whether or not the groundwater sample is representative of aquifer conditions (e.g. low turbidity and stable field parameters).

CSI will also obtain samples of groundwater from selected residences/commercial properties along U.S. Route 130. The groundwater quality at the Hodge commercial property and the Cruz, Kinney, Gates and Eyler residences will be evaluated. Provided authorization is granted by the property owners, CSI will obtain water samples from taps located in piping prior to any water treatment systems. If necessary, CSI may obtain a sample of groundwater from the well located at the commercial or residential property.

CSI will use Pro-Active Industries™ submersible pumps or a similar product to perform low-flow groundwater sampling. The proposed submersible pumps are lightweight, small diameter pumps designed to operate effectively at very low to moderately low pumping rates. The proposed pumps are designed for low-flow sampling and are well suited to minimize

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Mr. Joe Gowers  
NL Industries Superfund Site  
Page 4

disturbance of groundwater and promote collection of groundwater samples that are representative of aquifer conditions. The Pro-Active Industries™ submersible pumps can be dedicated to the wells at the site. If dedicated pumps are used, each pump will be used to sample only one well and there will be no need to decontaminate the pumps after use. The use of dedicated pumps and disposable sampling equipment is recommended by Puls and Barcelona as an excellent method of avoiding possible cross contamination of samples.

The Group will select a qualified laboratory to perform chemical analyses of groundwater samples and request EPA acceptance of the laboratory. The selected laboratory will analyze the samples for total lead, dissolved lead, total cadmium, and dissolved cadmium using EPA method ILM04.1 and VOCs using EPA method OLC03.2, or equivalent methods, if approved by EPA. The instrument detection limits for lead and cadmium will be as specified by the method. Samples will be preserved in accordance with the appropriate EPA method. Samples to be analyzed for total lead and total cadmium will not be filtered. Samples to be analyzed for dissolved lead and dissolved cadmium will be filtered in the field using disposable filters. CSI will use in-line and other field portable equipment to monitor groundwater parameters in the field including: dissolved oxygen, turbidity, specific conductance, oxidation-reduction potential, pH and temperature. CSI will document field parameters and use the results to evaluate whether or not a sample is representative of groundwater quality in the aquifer. Quality assurance/quality control (QA/QC) procedures will be generally consistent with those described in the QAPP and will be modified appropriately to accommodate the use of dedicated and disposable sampling equipment.

## *Possible Contingency Activities*

In the event of equipment malfunctions or lack of yield from a monitoring well, CSI may modify the sampling procedure to obtain representative groundwater samples. For example, CSI will measure field parameters using in-line (i.e. flow-through equipment) to the degree possible. However, to decrease the volume of water required from a low-yield monitoring well, CSI may obtain small volumes of water in clean containers and measure field parameters using portable meters. Also, if well yield is low and low-flow sampling cannot be performed without excessive draw down (i.e. without drying the well or increasing turbidity), then CSI may use an alternative method of sampling such as (i) removing one or more well volumes of groundwater from the well, (ii) drying the well several times prior to obtaining samples, or (iii) performing sampling over two days (i.e. CSI may purge a well on one day and obtain a sample from the well on the following day after the water level recovers). As a last resort, if a bailer is necessary to obtain a groundwater sample, then CSI will carefully lower a disposable bailer into the well, avoiding agitation to the degree possible, to retrieve sufficient water to fill sample bottles.

Field parameters will be used to evaluate whether or not a sample of groundwater is representative of ambient groundwater. If the turbidity of a sample is greater than 10 NTUs, then CSI will not consider the sample to be representative of ambient groundwater conditions (i.e.

# Construction Services International, Inc.

Mr. Joe Gowers  
NL Industries Superfund Site  
Page 5

apparent constituent concentrations will be biased high). Field parameters that do not stabilize or that vary significantly from previous measurements or measurements made at nearby locations may indicate that a sample is not representative of ambient conditions. High turbidity or other indicators of groundwater quality may be used to determine whether or not the integrity of a monitoring well was compromised during the remedial action. If the turbidity of the groundwater sample is above 10 NTUs or if field parameters do not stabilize or appear inconsistent with previous data or data obtained nearby or if turbidity is high, then CSI may request that the sample be omitted from laboratory analysis or that the data be qualified, if analyzed. CSI will evaluate the groundwater quality data and make recommendations regarding well use or abandonment after the initial monitoring event.

## *QA/QC*

QA/QC procedures to be performed will be consistent with the QA/QC procedures previously used for groundwater monitoring. Applicable QA/QC procedures outlined in the *QAPP* will be used to validate groundwater data. The laboratory will use the QA/QC procedures required by the selected analytical method.

## *Data Evaluation and Reporting*

Upon receipt of laboratory data from the selected laboratory, CSI will validate the data and prepare a report to present the data and summarize the findings. The report will include a description of procedures, QA/QC information, and a comparison of new data to previously collected data to evaluate whether or not groundwater quality at the site continues to improve. The report will also include recommendations for additional work at the site, which will include additional monitoring, and could include the abandonment of additional wells and/or the installation of additional or replacement monitoring wells. CSI and the Group also anticipate that the new data will supplement the information provided in the *Phase II Groundwater Evaluation Technical Memorandum* [GeoSyntec, 1999] and GeoSyntec's recommendation that consideration be given to evaluating alternate remedial options, including the injection of alkalinity to enhance the removal of constituents from groundwater.

## *Schedule*

CSI recommends that the replacement wells KSR, KDR, JDR and 30R be installed and developed and that abandonment of the obviously damaged wells be performed approximately two weeks prior to groundwater sampling is performed to minimize any effects of drilling. After installing the replacement wells and abandoning selected wells, CSI will perform groundwater-monitoring activities at the site in December 2003 upon receipt of EPA's authorization to proceed. At the present time, CSI anticipates that a report to present the data and summarize the findings would be submitted to EPA within 11 to 12 weeks after the commencement of groundwater sampling activities.

# Construction Services International, Inc.

*Mr. Joe Gowers  
NL Industries Superfund Site  
Page 6*

If you have any questions, please call me at (410) 268-7261.

Sincerely,

CONSTRUCTION SERVICES INTERNATIONAL, INC.

A handwritten signature in black ink, appearing to read 'JW Moore', with a long horizontal flourish extending to the right.

Jeffrey W. Moore, P.G., P.E.  
Principal

cc: Mr. Paul Harvey – New Jersey Department of Environmental Protection (w/attachments)  
Technical Committee, Interim Pedricktown Site Group (w/attachments)

Attachments

**Table 1**  
**Planned Groundwater Monitoring Locations and Well Construction Details**  
**NL Industries Superfund Site**  
**Pedricktown, New Jersey**

Monitoring Well	Casing Diameter	Well Depth <sup>(1)</sup>	Screened Interval <sup>(2)</sup>	Top of Casing Elevation <sup>(3)</sup>	Depth To Water <sup>(4)</sup>	Aquifer Zone <sup>(5)</sup>
BR	4	39	33-39	10.82	3.4	UA
JS	2	17	17-27	13.89	5.12	UA
JDR <sup>(6)</sup>	2	approx. 30	approx. 20-30	TBD	TBD	UA
KSR <sup>(6)</sup>	2	approx. 20	approx. 10-20	TBD	TBD	UA
KDR <sup>(6)</sup>	2	approx. 30	approx. 20-30	TBD	TBD	UA
NS	2	16.5	6.5-16.5	13.24	NM	UA
ND	2	24	14-24	12.29	NM	UA
OS	2	21.3	6.3-21.3	10.92	5.63	UA
OD	2	37.3	12.3-37.3	13.38	6.52	UA
SS	2	16.4	6.4-16.4	12.7	4.78	UA
SD	2	29.4	17.4-29.4	13.39	5.47	UA
11	4	54.1	34.1-54.1	11.19	3.64	UA
22	2	16	11-16	13.01	7.02	UA
23	2	24	24-34	12.85	6.81	UA
26	2	22	12-22	10.77	NM	UA
27 <sup>(7)</sup>	2	15	5-15	15.45	9.28	UA
28	2	30	20-30	15.28	9.15	UA
30R <sup>(6)</sup>	2	approx. 30	approx. 20-30	TBD	TBD	UA
31	2	15	5-15	13.21	6.91	UA
32	2	30	20-30	13.16	7.8	UA
33	2	10	5-10	5.44	NM	UA
34	2	20	10-20	5.44	NM	UA
12	4	78.2	58.2-78.2	12.81	NM	FCA
24	2	73	68-73	11.92	14.92	FCA

<sup>(1)</sup> Depth to bottom of well in feet below top of casing (TOC), prior to remedial action.

<sup>(2)</sup> Screened interval of well in feet below ground surface, prior to remedial action.

<sup>(3)</sup> TOC elevation in feet above mean sea level, prior to remedial action.

<sup>(4)</sup> Depth to water in feet below TOC, measured in April 2003.

<sup>(5)</sup> UA = Unconfined Aquifer, FCA = First Confined Aquifer

<sup>(6)</sup> Well construction information is preliminary.

<sup>(7)</sup> CSI will repair protective cover. CSI will evaluate further using field data.

NM = Not measured. Only wells potentially affected by remedial action were evaluated.

TBD = To be determined.

**LEGEND:**

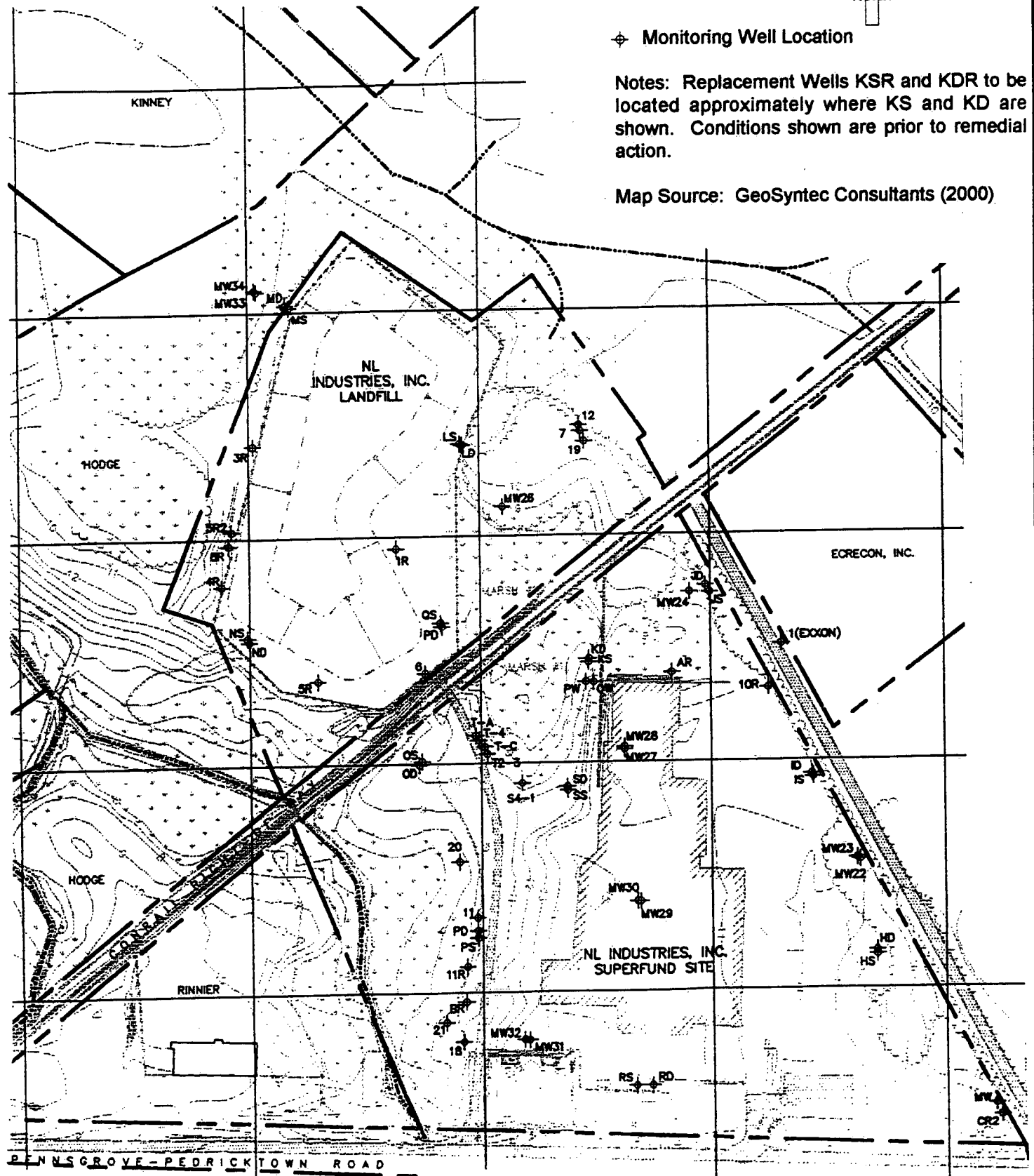
Scale: 1"=300'



⊕ Monitoring Well Location

Notes: Replacement Wells KSR and KDR to be located approximately where KS and KD are shown. Conditions shown are prior to remedial action.

Map Source: GeoSyntec Consultants (2000)



Sheet  
1 of 1

File Name: SitePlan.vsd  
Prepared by: JWM  
Date: 22 April 03  
Revision: 0  
Scale: 1"=300'

**Figure 1**  
**Site Plan**  
NL Industries Superfund Site  
Pedricktown, New Jersey

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